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## INTRODUCTION

Grant funds became available Sept. 1, 1965 and a very large portion of our effort since that time has been consumed in building the laboratory into a well-equipped and we hope eventually productive organization. The University has provided about 2,000 square feet of completely renovated space. We have now a large pleasant laboratory, two professorial offices, one office for graduate students, and one secretarial office.

"Space Physics" (for want of a better name) had not existed before in the University of Wisconsin Physics Department, though Professors Code in Astronomy and Suomi in Meteorology have had very active NASA sponsored flight programs for some time.

A two-semester course sequence in Space Physics is planned. The first semester (to be given by Professor Scherb in the fall of 1966) concerns primarily processes which occur in interplanetary space, and the second semester (being given this current semester by Professor Kraushaar) concerns primarily interstellar space. Professor Scherb is currently giving a course - Space Science and Technology - for undergraduate and first-year graduate students in physics, engineering, astronomy, etc.

We have organized an "Astronomy-Space Physics Journal Club" which meets weekly to hear graduate students and staff report on recent preprints received or recently published papers.

## GAMMA RAY SPARK CHAMBER

This is part of the Ph.D. thesis work of Paul Higbie, an MIT graduate

student. Mr. Higbie is here, employed essentially as a regular University of Wisconsin graduate student, though his degree will be from MIT.

The chamber has been designed specifically to study diffuse cosmic gamma rays in the 10-60 Mev region. The purpose of the study is to distinguish between the two likely diffuse gamma-ray emission mechanisms -  $\pi^0$ -decay and inverse Compton collisions. Considerable delay in the completion and flight of this apparatus has resulted from the transfer of the program from MIT to Wisconsin. Current hopes are that it will be flown this spring.

(P. R. Higbie)  
(W. L. Kraushaar)

#### OA0 AND OSO GAMMA RAY DETECTORS

The OA0 A-1 flight package was delivered to Grumman last spring and responsibility for the integration tests, etc. have remained at MIT. Kraushaar is still Principle Investigator and portions of the data reduction will be carried out here. It will be recalled that the OA0 A-1 gamma-ray instrument is the flight spare model of the identical instrument flown as Explorer XI.

Because of a serious breakdown of the Cal. Tech. synchrotron, the OSO-C gamma-ray detector was not properly calibrated prior to the August flight attempt and failure. The flight spare, now scheduled to be flown on OSO E-1, was therefore taken to Cal.Tech. in early December for calibration. Garmire and Hinteregger of MIT and Kraushaar spent several days re-aligning the analyzing magnets, etc. only to have the synchrotron fail again. Fortunately, the machine was repaired by mid-January and the calibration completed by Hinteregger.

Initial analysis of the OSO data will be done at MIT where the computer programs have been developed. Kraushaar is Principal Investigator for the OSO program also, and some of the data analysis will be done here.

(W. L. Kraushaar)

#### X RAYS

In June of 1965 we proposed an X-ray detector to be flown on the Instrument Unit of the Saturn IB-V rocket. Indications from NASA headquarters were that they thought the approach sensible, reviews of the proposal, we are told, have been favorable, and we have proceeded with design studies of the few parts of the proposed instrument that are non-standard. Specifically, the proportional counters have been designed and one has been ordered and delivered. To date its performance has been satisfactory and as expected. It is 2" wide, 20" long, has a 2 mil Be window and is filled with 90% Xenon-10% methane at atmospheric pressure. Also, since we wish to have an aspect determination independent of the Saturn system, we have given considerable attention to the design of star sensors. We had hoped by suitable collimator and baffle design to be able to sense  $3^m$  stars  $45^\circ$  from the sun without complicated moving slits, etc. It appears that we shall not be able to realize this goal and will be able to sense stars only  $90^\circ$  or more from the sun. This will permit independent aspect determination over about  $75^\circ$  of an average orbit and should be satisfactory since the Saturn aspect data will be available to us.

To date, final approval of this proposal has not been received.

(W. L. Kraushaar)  
(F. Scherb)

SOLAR DEUTERIUM INVESTIGATION

Although some time and effort have been spent in designing and constructing environmental test equipment for the experiment, the most important problem has been the construction of a practical 100-kilovolt power supply suitable for flight hardware. Design studies were carried out in the summer of 1965 in collaboration with the MIT Center for Space Research, and an order for a 100-kilovolt unit was placed with the Sippican Corporation - Francis Associates of Marion, Massachusetts. In February, 1966, the unit was delivered to MIT where it is now being tested. If the high-voltage supply operates satisfactorily, we will submit a proposal to NASA for flight on an IMP satellite.

(F. Scherb)

Publication

Frank W. Floyd and Frank Scherb, A Solar Wind Deuterium Detector and Charge Spectrum Analyzer. To be published in the April, 1966 issue of Proceedings of the Institute of Electrical and Electronic Engineers.

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